

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Banika Fashions Ltd.
Address of the Factory	: Plot # 789, BSCIC Industrial Estate Konabari, Gazipur, Bangladesh.
Present Status of the Factory	: Under Operation.
Structural Assessment Conducted by	: VEC
Date of Structural Inspection	: 27 th Jun, 2015
Fire Assessment Conducted by	: VEC
Date of Fire Inspection	: 27 th Jun, 2015
Electrical Assessment Conducted by	: VEC
Date of Electrical Inspection	: 27 th Jun, 2015
BGMEA Membership No.	: 3814

BASIC INFORMATION:

The assessed factory building is a seven storied RCC beam column frame structure and it was approved for 7 stories as well. The entire building is used for Banika Fashions Ltd. The following general information were noted:

i. Building Usage Type	: Garment Factory.
ii. Structural System	: RCC beam column frame structure.
iii. Floor System	: RCC beam slab floor system.
iv. Floor Area	: Total floor area is 72,000 sft. for main factory building.
v. No. of Stories	: 7 Storey.
vi. Construction Year	: 2007-2008
vii. Foundation Type	: Isolated column footing foundation.
viii. Design Drawings	: Available document: Approval plan, and structural design drawing. Not available: Architectural design drawing, Soil test report, machine layout plan, floor load plan, material test report.
ix. Soil Investigation Report	: Unavailable.
x. Construction Materials	: Brick aggregate in column.
xi. Generator	: At ground floor.

RECOMMENDATIONS FOR CORRECTIVE ACTION:

The recommendations of corrective action for both Structural and Fire & Electrical Safety comprises in Short Term, Mid Term and Long Term basis.

The recommendations for **Structural Safety** corrective action are:

Short Term (Immediate)	: None.
Mid Term (6-weeks)	: <ul style="list-style-type: none">• Structural Engineer to be reviewed the structural design, loads and columns stresses in area identified above.• Verify in situ concrete stresses either by 100mm dia. cores or existing cylinder strength data for [the identified columns] or [100mm dia. cores from 4 columns].
Long Term (6-months)	: <ul style="list-style-type: none">• Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity.

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- Continue to implement load plan.

The recommendations for **Fire & Electrical Safety** corrective action are:

(A): Recommendations for Fire Safety corrective actions:

<p>Immediate</p> <p><i>(the factory should not continue to be occupied until these non-conformities have been rectified):</i></p>	<ul style="list-style-type: none"> • None.
<p>Short Term</p> <p><i>(Actions that must be incorporated into a Fire Safety Management Plan immediately (1 ~ 2 weeks) and should be a regular activity</i></p>	<ul style="list-style-type: none"> • Fire drill shall be conducted quarterly (4 times a year) under the Fire Safety Plan. A record of such drills shall be kept in writing for at least 3 years for the inspection of fire brigade whenever called for. • Factory needs to have marked aisles in all working floor according to 0.9m for one side seat and 1.0m for both side seat. • Factory needs to have sufficient number and width (0.9m) of marked aisles at all occupied floors. • Lights in storage area needed to be installed with protective covers and conduits. • Factory needs to close all the opening in the rated walls by 2 hours rated construction/enclosure or 1.5 hours rated doors • Combustibles are to be managed with good housekeeping. Storage facilities with no air-conditioning duct shall be minimum 2.9 m and when used as a storage facility there shall be a minimum clearance of one third the floor height from the ceiling to the top of the storage stack. • All required means of exit or exit access in buildings or areas requiring more than one exit shall be signposted. The signs shall be clearly visible at all times, where necessary supplemented by directional signs.
<p>Mid Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 weeks)</i></p>	<ul style="list-style-type: none"> • Factory needs to prepare as built drawing with floor machine layout showing means of escape with proper dimension. • Fire license need to be updated for full occupied area. • Fire manager/Director need to have safety training from proper authority & worker of the factory should as far as possible be trained for use fire extinguisher. • Factory need to have proper testing plan & record for

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	<p>fire safety equipment.</p> <ul style="list-style-type: none"> • All the exit doors need to be replaced by side swinging so that un-lockable doors can be opened easily in the direction of evacuation without the use of a key. • Factory needs to provide handrail on both sides of all stairways. • Factory needs to develop the safety management of flammable liquids storage action according to NTPA guideline. • Factory needs to be install with adequate illuminated emergency lighting in all floors, exits and stairs. (Escape route) • Factory need to have emergency backup power for critical fire safety system with sufficient capacity & arrangement according to NTPA Guideline.
<p>Long Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 months)</i></p>	<ul style="list-style-type: none"> • Fire department pre-plan needs to be developed • Final exit route-1(Stair-1 route) need to be protected) 2 hours rated construction with 1.5 hours rated door) at each floor level entrance including ground floor and need to be protected from the generator at ground floor by 4 hours rated construction with 2 hours rated door/opening, also need to have protected escape route till to reach save refuse area. • Final exit route-2 (Stair-2 route) need to be protected (2 hours rated construction with 1.5 hours rated door) at each floor level entrance and need to be protected from the yarn store room and cargo lift by 2 hours rated construction with 1.5 hours rated door/opening, and for cargo lift needs 1 hour rated opening and also need to protect escape route till to reach save refuse area. • Storage area need to be protected with 2 hours rated construction & 1.5 hours rated opening or doors. • Boiler & chemical room: Boiler & chemical room need to be protected with 4 hours rated construction & 2 hours rated opening / door from the working floor (knitting section) of ground floor of the building. • Generator: Generator room need to be protected yb 4 hours rated construction weth 2 hours rated opening. • All the stairs need to be protected with fire and smoke resistant enclosures and opening (2 hours rated enclosure and 1.5 hour rated door) and provide the protected route from all though the stairway to the final exits. • Factory need to protect the lift with 2 hours rated

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	<p>enclosure and 1 hour rated auto closing fire door.</p> <ul style="list-style-type: none"> • Factory need to install fire lift with backup power including having 1hour fire rated & auto closing fire door in 2hours fire rated lift core with backup power & having minimum capacity of 545rkg. • Factory need to install centralized and automatic fire detection & alarm system on all occupied floors, including other tenanted floors of the building as per NTPA Guideline • The factory need to install manually operated electrical fire alarm system and automatic fire alarm system with single or multiple call boxes on all occupied floors, including other tenanted floors of the building. • Factory needs to install control panel for centralized automatic smoke detection & fire alarm system according to NTPA Guideline. • Factory need to install suitable public address system having communication to all floors as well as facilities to receive messages from all floors. • Factory needs to install proper standpipe system having at least 100mm diameter of riser according to NTPA guideline. • Install 1 riser per 1000 m² of floor area & Install adequate number of hose in floor area and the minimum hose diameter is 38 mm, or 1.5" preferably fabric hose with variable nozzle to be used in both of the stairways covering the floor area. • Factory need to ensure the minimum pressure for standpipes supplying a 50mm or larger hose shall be at least 300 Kpa. For standpipe supplying first aid hose (38mm nominal) may have a minimum pressure of 200 Kpa. • Factory need to have dedicated fire pump with backup power system & sufficient capacity for achieve required pressure in the remote place of the factory. • Factory need to have sufficient water storage capacity to get adequate pressure to feed fire-fighting equipment and at least $1900 \times 75 = 142500$ liters water storage tank.
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(B): Recommendations for Electrical Safety corrective actions:

<p>Immediate</p> <p><i>(the factory should not continue to be occupied until these non-conformities have been rectified):</i></p>	<ul style="list-style-type: none"> • Find out the cause (improper cable selection, improper protective device selection, improper termination, rusted connection, heat source etc.) of burning sign/insulation damage and take proper action including replacing cable or equipment where necessary.
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	<ul style="list-style-type: none"> • Find out the cause (improper cable/over current selection, over loading, improper lug, improper cable joints, rusted connection, insulation damage, multiple cables at single point,) of overheating (> ambient+ 40⁰C) and take proper action.
<p>Short Term</p> <p><i>(Actions that must be incorporated into a Fire Safety Management Plan immediately (a week) and should be a regular activity)</i></p>	<ul style="list-style-type: none"> • Ensure all distribution boards (including panel door) are earthed properly. • Install circuit breaker in proper way and proper place to ensure safe installation. • Ensure all electrical cable properly terminated at its point of termination. • Ensure overcurrent protection device (circuit breaker/fuse) for each circuit/branch circuit. • Ensure proper earthing connections at all electrical equipment. • Clean interior components from dust and debris and seal all openings within the enclosure to prevent dust and debris from entering. • Ensure inspection is being completed and documented for all earthing system.
<p>Mid Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 weeks)</i></p>	<ul style="list-style-type: none"> • Post safety signage in the generator room and ensure graded rubber mats are provided in front of all distribution boards. • Provide Instruction board for first aid and artificial respiration in the generator room. • Ensure distribution boards have a minimum clearance of 1 m (39 in) in front. • Provide dedicated & adequate size of earthing with proper identification for each circuit. • Rewire to ensure each incoming supply to an MCB/MCCB has a dedicated supply from bus-bar. Avoid the use of multiple cables on outgoing side of MCB's / MCCB's. • Replace wooden bases with metal clad construction for mounting the circuit breakers. • Ensure all electrical cables are sized according to capacity of circuit breakers. • Provide adequate support or mechanical guards for

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	<p>electrical equipment and wiring where necessary.</p> <ul style="list-style-type: none"> • Ensure cable joints are made in respect of conductivity, insulation and mechanical strength. • Seal the openings remaining after wiring system passes through the elements of building construction according to the degree of fire resistance. • Ensure discrimination is achieved between circuit breakers used for protection of main circuit and the sub-circuits derived therefrom. • Connect all metal in the building to the building earthing system. • Ensure Lighting fixtures are supported from the structure properly. • Find out the cause (improper cable/over current selection, over loading, improper lug, improper cable joints, rusted connection, insulation damage, multiple cables at single point,) of overheating { ambient+(20°C-40°C)} and take proper action.
<p>Long Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 months)</i></p>	<ul style="list-style-type: none"> • Develop an electrical layout diagram and an as-built single line diagram detailing key components and capacity of the electrical system. • Establish a periodical Insulation and earth Resistance Measurement Program and record the related testing data. • Inspect electrical switchgear and panel boards on an annual basis. • Ensure the generator room has adequate fire separation from the production area. • Provide adequate means of ventilation for the generator room based on the installed equipment considering fire barriers. • Ensure appropriate generator room size in order to properly access the generator to perform routine maintenance activities. • Ensure electrical panel boards have no opening and all live internal components are concealed properly. • Provide dedicated & adequate size of neutral with

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	<p>proper identification for each circuit.</p> <ul style="list-style-type: none">• Ensure each distribution board is provided with a circuit list and means of identification is provided as per list.• Provide adequate covers on cable channel.• Ensure surface/exposed wiring are run either horizontally or vertically with proper mechanical support and avoid wiring at an angle or hanging way with improper support.• Provide proper cable terminator/connector for stranded conductors at its point of termination.• Run cable in a designated route with mechanical protection and fire sealing of floor slab and wall penetrations.• Install separate distribution boards for lighting and power circuits.• Install lightning protection system on the building.
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